Indiana's State Wildlife Action Plan

Planning Region 1: Great Lakes

SURVEY 1 REPORT

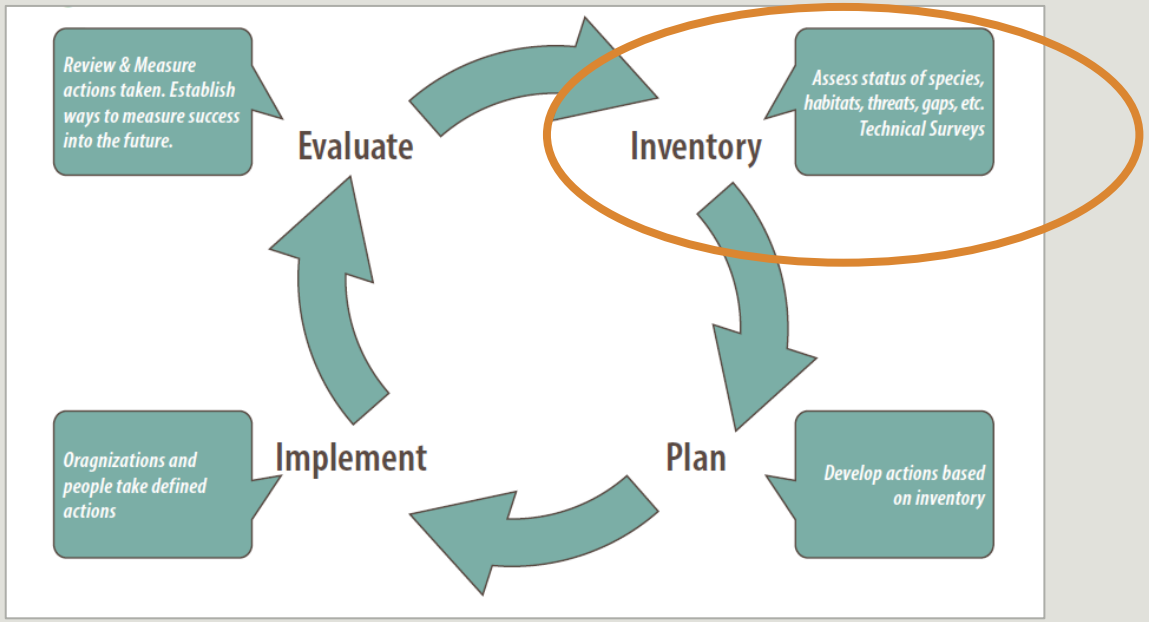
SWAP *Conservation doesn't just happen. It requires resources and collaboration.*

Survey 1: Purpose

Focused on species of greatest conservation need (SGCN)

Update status & assess trends

State-wide perspective



Survey 1 Questions

1. Update basic information about SGCN
   - Trends in abundance (past and future)
2. Assess habitat conditions for SGCN
   - Current conditions
   - Trends in quantity and quality (past and future)

Target audience: technical experts from state agencies, universities, and other organizations working directly with SGCN

Survey 1 Questions

3. Determine threats to SGCN using common language
4. Discuss conservation actions directly relevant to species
   - Barriers to implementation
   - Effectiveness of actions taken since 2005
5. Choose representative species for landscape-level habitat modelling
   - Regional perspective

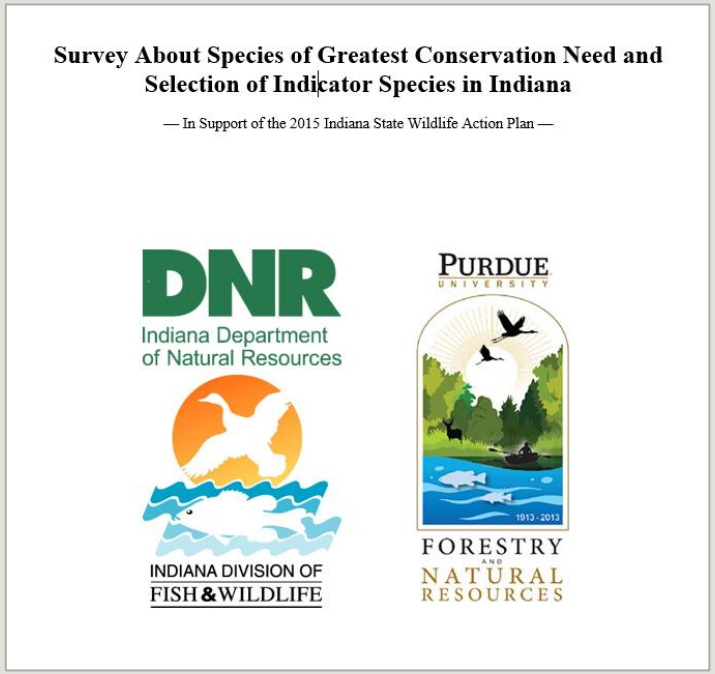
Target audience: technical experts from state agencies, universities, and other organizations working directly with SGCN

Survey 1 Responses

Total responses: 486 (1-15 per species)

Additional data updates:

- Changes in conservation status
- Regional distribution
- Habitat associations
- Changes in land cover
- Insect distribution & habitat



Changes to SGCN List

Removed

- Bobcat
- River otter

Reintroduced river otters. Credit: IDNR

Removal suggested

- Bald eagle
- Osprey
- Peregrine falcon
- Sandhill crane
- Species occurring in Indiana on periphery of their range

Changes to SGCN List

Added

- Migratory shorebirds
  - Ruddy turnstone, buff-breasted sandpiper, short-billed dowitcher, Wilson's phalarope, American golden-plover, greater yellowlegs, solitary sandpiper
- Eastern small-footed myotis
- Northern cricket frog
- Mole salamander
- Eastern box turtle

Addition suggested

- All cave bats
- Ruffed grouse
- American woodcock
- Northern bobwhite

Cave bats affected by white-nose syndrome. Credit: Bat Conservation Trust

SGCN – Region 1

Mammals (10)

- Bats (6)
  - Silver-haired Bat
  - Eastern Red Bat
  - Hoary Bat
  - Little Brown Myotis
  - Northern Long-eared Myotis
  - Indiana Myotis
- Mustelids (2)
  - Least Weasel
  - American Badger
- Moles (1)
  - Star-nosed Mole
- Rodents (1)
  - Franklin's Ground Squirrel

Eastern red bat. Credit: John Farabaugh

SGCN – Region 1

Breeding Birds (33)

- Shorebirds (3)
  - Upland Sandpiper
  - Piping Plover
  - Wilson's Phalarope
- Herons & Bitterns (3)
  - American Bittern
  - Least Bittern
  - Black-crowned Night-Heron
- Rails (3)
  - Common Moorhen
  - King Rail
  - Virginia Rail
- Terns (2)
  - Black Tern
  - Least Tern
- Nightjars (2)
  - Eastern Whip-poor-will
  - Common Nighthawk
- Raptors (10)
  - Sharp-shinned Hawk
  - Short-eared Owl
  - Red-shouldered Hawk
  - Broad-winged Hawk
  - Northern Harrier
  - Peregrine Falcon
  - Bald Eagle
  - Osprey
  - Barn Owl
- Songbirds (11)
  - Henslow's Sparrow
  - Marsh Wren
  - Sedge Wren
  - Loggerhead Shrike
  - Black-and-white Warbler
  - Cerulean Warbler
  - Kirtland's Warbler
  - Hooded Warbler
  - Western Meadowlark
  - Golden-winged Warbler
  - Yellow-headed Blackbird

Piping Plover. Credit: John Cassady

SGCN – Region 1

Migratory Birds (11)

- Cranes (2)
  - Whooping Crane
  - Sandhill Crane
- Waterfowl (1)
  - Trumpeter Swan
- Egrets (1)
  - Great Egret
- Rails (1)
  - Black Rail
- Shorebirds (6)
  - Ruddy Turnstone
  - Buff-breasted Sandpiper
  - Short-billed Dowitcher
  - American Golden-Plover
  - Greater Yellowlegs
  - Solitary Sandpiper

Foraging shorebirds. Credit: NRCS

SGCN – Region 1

Amphibians & Reptiles (16)

- Aquatic Salamanders (1)
  - Mudpuppy
- Terrestrial Salamanders (2)
  - Blue-spotted Salamander
  - Four-toed Salamander
- Frogs (3)
  - Northern Cricket Frog
  - Plains Leopard Frog
  - Northern Leopard Frog
- Snakes (6)
  - Kirtland's Snake
  - Copper-bellied Watersnake
  - Smooth Greensnake
  - Massasauga
  - Butler's Gartersnake
  - Western Ribbonsnake
- Turtles (4)
  - Spotted Turtle
  - Blanding's Turtle
  - Eastern Box Turtle
  - Ornate Box Turtle

Copper-bellied watersnake. Credit: Debbie Burton

SGCN – Region 1

Fish & Mollusks (27)

- Carps & Minnows (2)
  - Pugnose Shiner
  - Longnose Dace
- Lampreys (1)
  - Northern Brook Lamprey
- Sculpins (1)
  - Slimy Sculpin
- Sturgeons (1)
  - Lake Sturgeon
- Suckers (2)
  - Longnose Sucker
  - Greater Redhorse
- Trout-perches (1)
  - Trout-perch
- Trouts & Salmons (2)
  - Cisco
  - Lake Whitefish
- Snails (2)
  - Pointed Campeloma
  - Swamp Lymnaea
- River Mussels (12)
  - White Catspaw
  - Northern Riffleshell
  - Snuffbox
  - Wavyrayed Lampmussel
  - Round Hickorynut
  - Clubshell
  - Kidneyshell
  - Salamander Mussel
  - Purple Lilliput
  - Ellipse
  - Rayed Bean
  - Little Spectaclecase

River mussel diversity. Photo courtesy of USFWS

Survey Results Summary

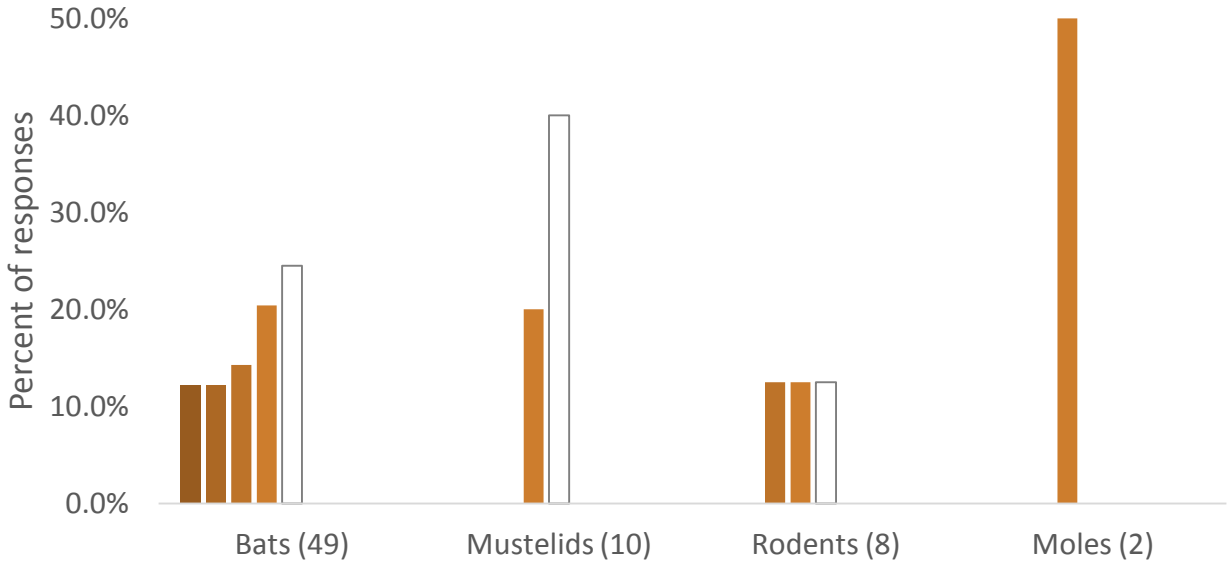
1. Trends in Abundance
   - Past
   - Future
2. Current Habitat conditions
   - Total amount
   - Overall quality
3. Past Habitat Trends
   - Total amount
   - Overall quality
4. Future Habitat Trends
   - Total amount
   - Overall quality

Survey Results: Past Trends in Abundance

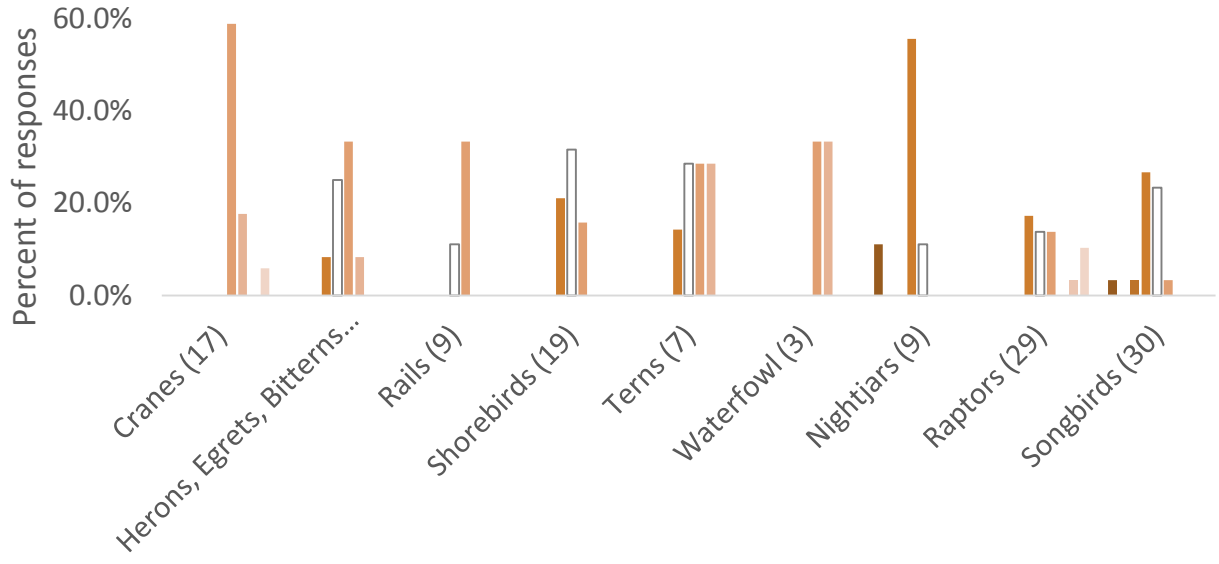
Goal: Determine which species have declined or increased most since the 2005 SWAP was implemented, and get an overall sense of how populations of SGCN have done since then.

Question: Estimate the change in abundance of [species] in Indiana **since 2005**.

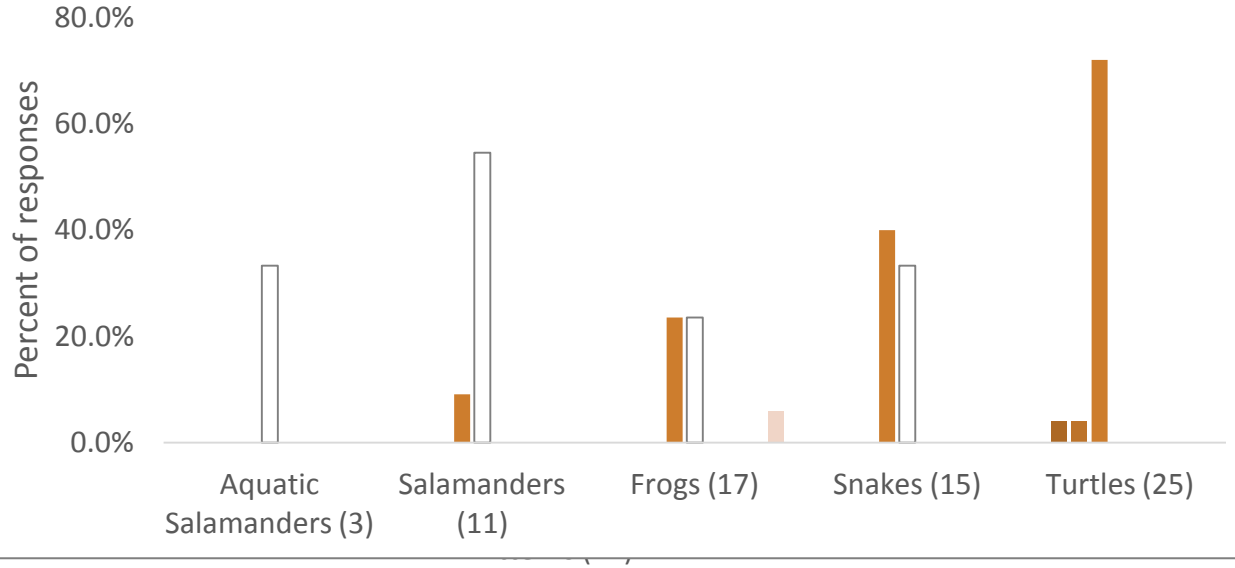
Trends in Abundance of Mammals since 2005



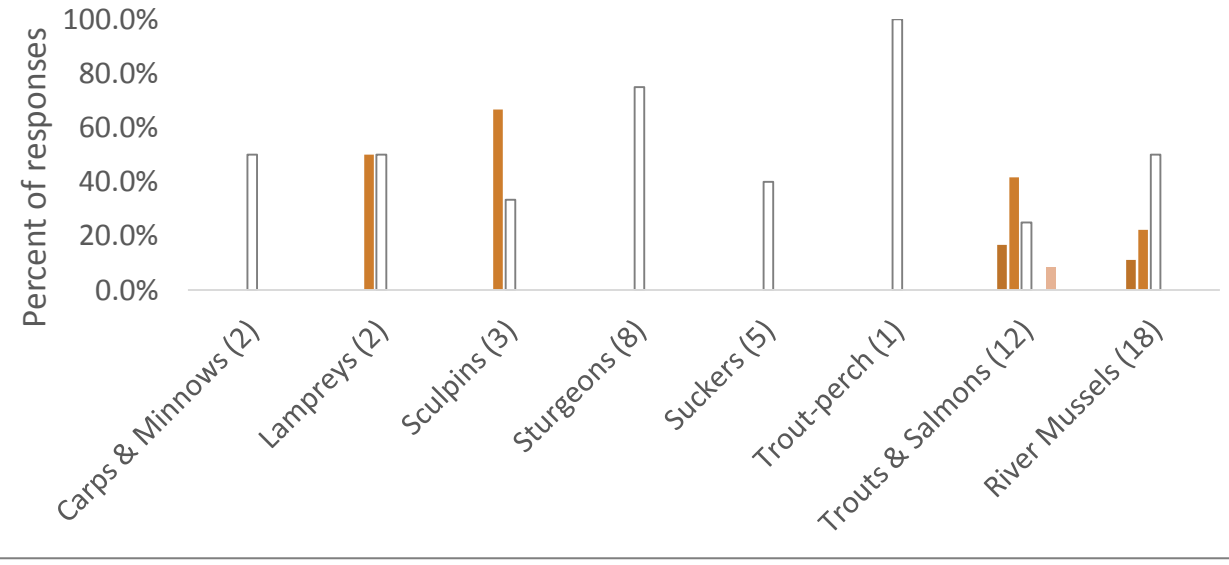
Trends in Abundance of Birds since 2005



Trends in Abundance of Amphibians & Reptiles since 2005



Trends in Abundance of Aquatic Species since 2005



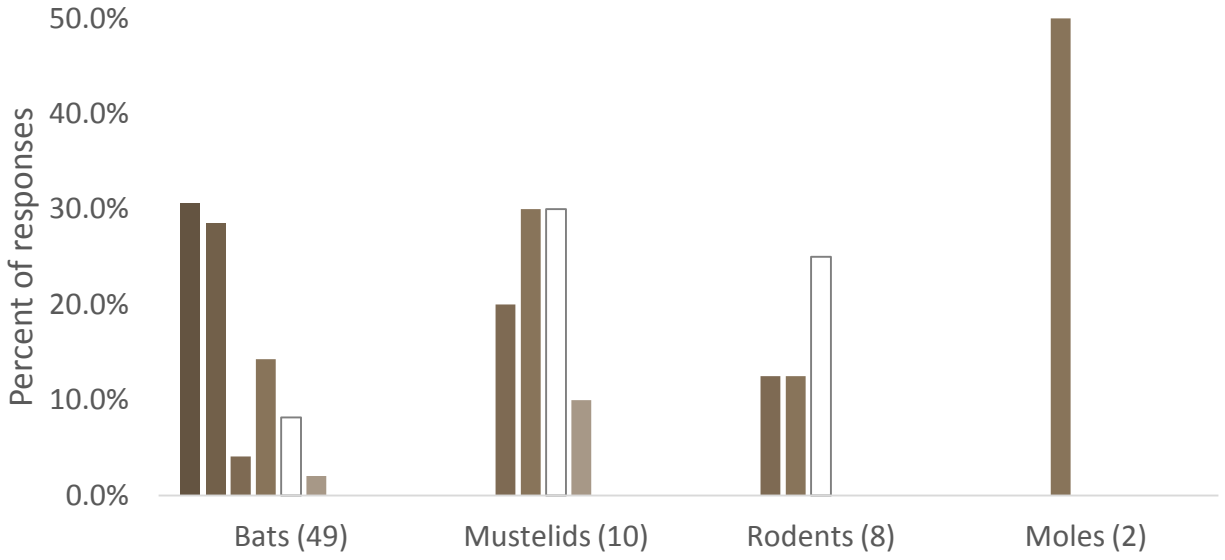
Declined by >75%
Declined by 50-75%
Declined by 25-50%
Declined by 5-25%
Remained relatively constant
Increased by 5-25%
Increased by 25-50%
Increased by 50-75%
Increased by >75%

Survey Results: Future Trends in Abundance

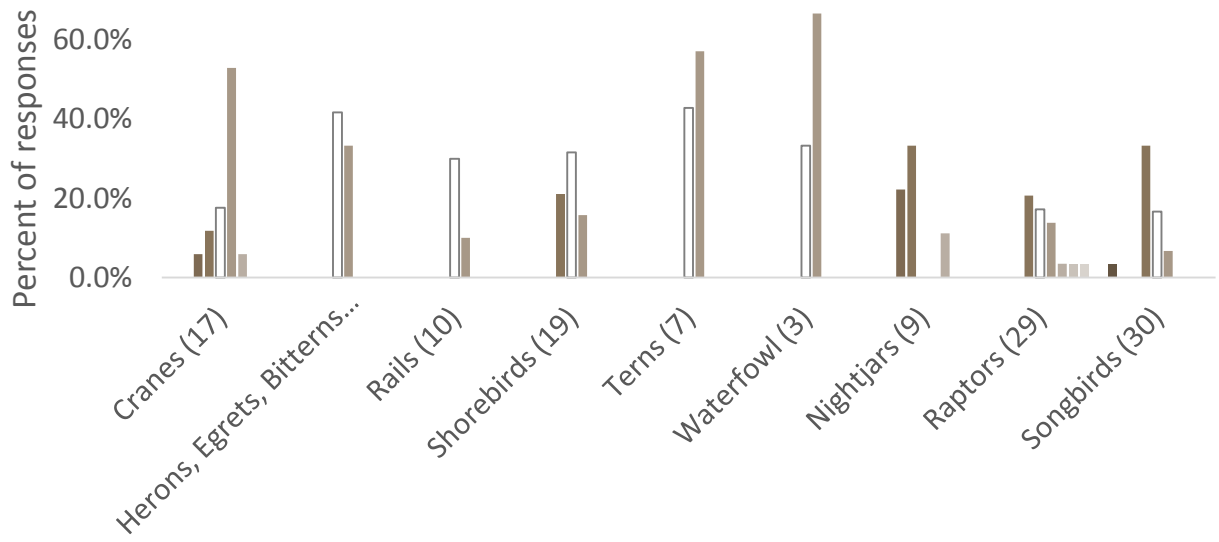
Goal: Determine which species are most likely to decline or increase while the 2015 SWAP is in place, and get an overall sense of how SGCN can be expected to do over the next decade if actions are not taken.

Question: How would you predict the abundance of [species] in Indiana to change **over the next 10 years**, if current conditions and practices prevail?

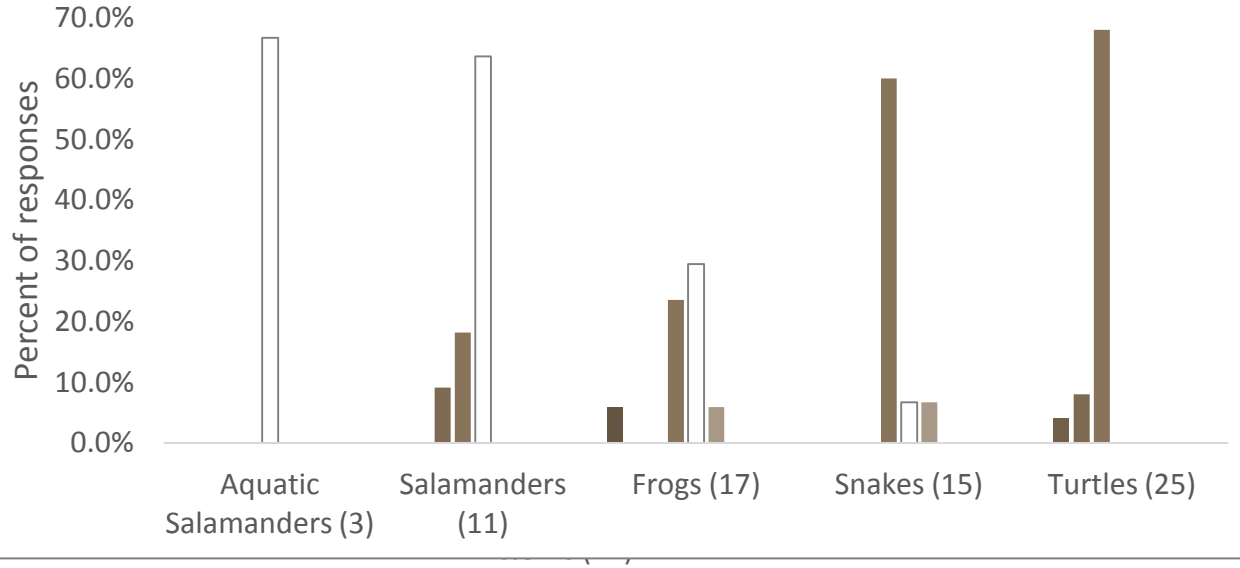
Trends in Abundance of Mammals by 2025



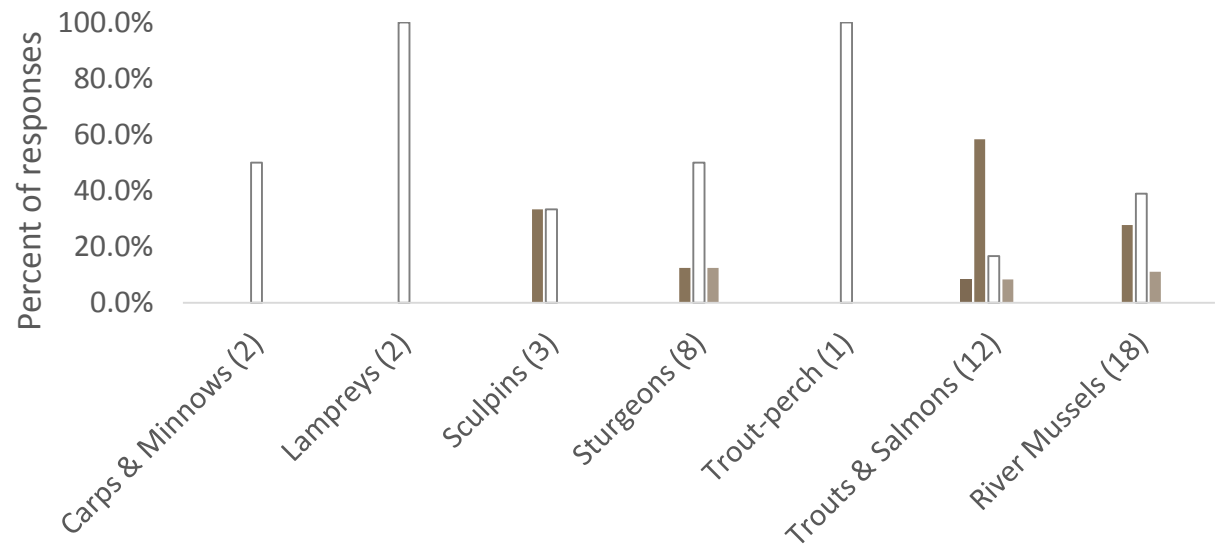
Trends in Abundance of Birds by 2025



Trends in Abundance of Amphibians & Reptiles by 2025



Trends in Abundance of Aquatic Species by 2025



Will decline by >75%
Will decline by 50-75%
Will decline by 25-50%
Will decline by 5-25%
Will remain relatively constant
Will increase by 5-25%
Will increase by 25-50%
Will increase 50-75%
Will increase by >75%

Trends in Abundance

Species in serious/dramatic decline **since 2005**:

- Eastern whip-poor-will
- Loggerhead shrike
- Little brown myotis
- Northern long-eared myotis
- Round hickorynut mussel

Species expected to seriously decline **by 2025**, if current conditions & practices prevail:

- Loggerhead shrike
- Little brown myotis
- Northern long-eared myotis
- Indiana myotis

Whip-poor-will, loggerhead shrike, Indiana bat. Credits: Paul Cools , John Maxwell, Justin Boyles

Trends in Abundance

Species that have greatly/dramatically increased **since 2005**:

- Whooping crane
- Bald eagle
- Osprey
- Trumpeter swan
- Lake Whitefish

Species expected to greatly/dramatically increase **by 2025**, if current conditions & practices prevail:

- Bald eagle
- Osprey

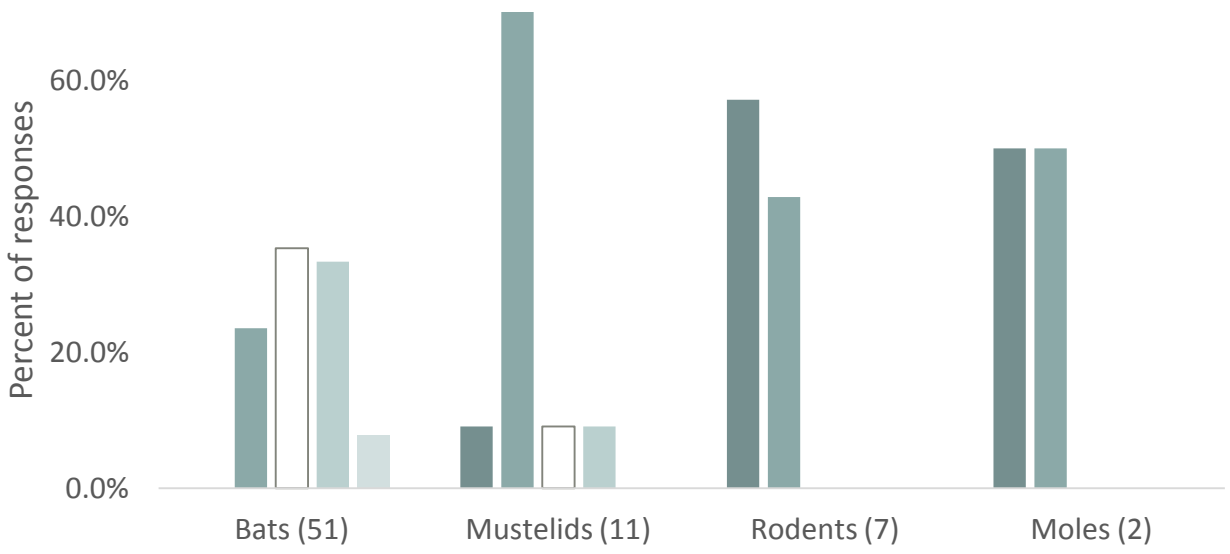
Whooping cranes, bald eagle, osprey, trumpeter swan. Credits: IDNR/USFS

Survey Results: Current Habitat Conditions

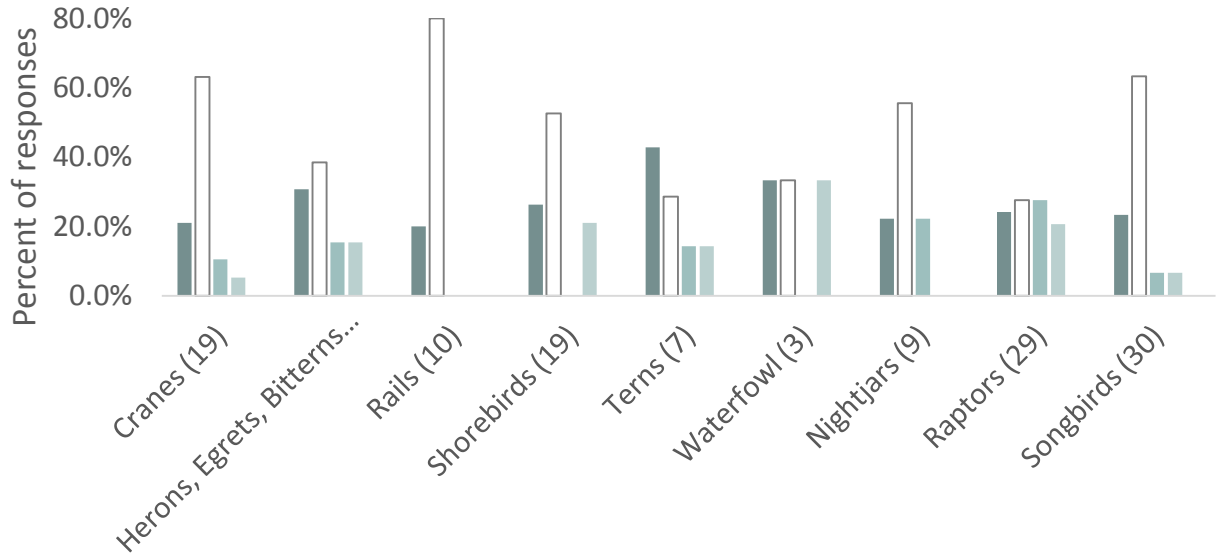
Goal: Understand current habitat conditions for SGCN in terms of both quantity and quality.

Question: How would you describe the **total amount** of habitat in Indiana available to [species]?

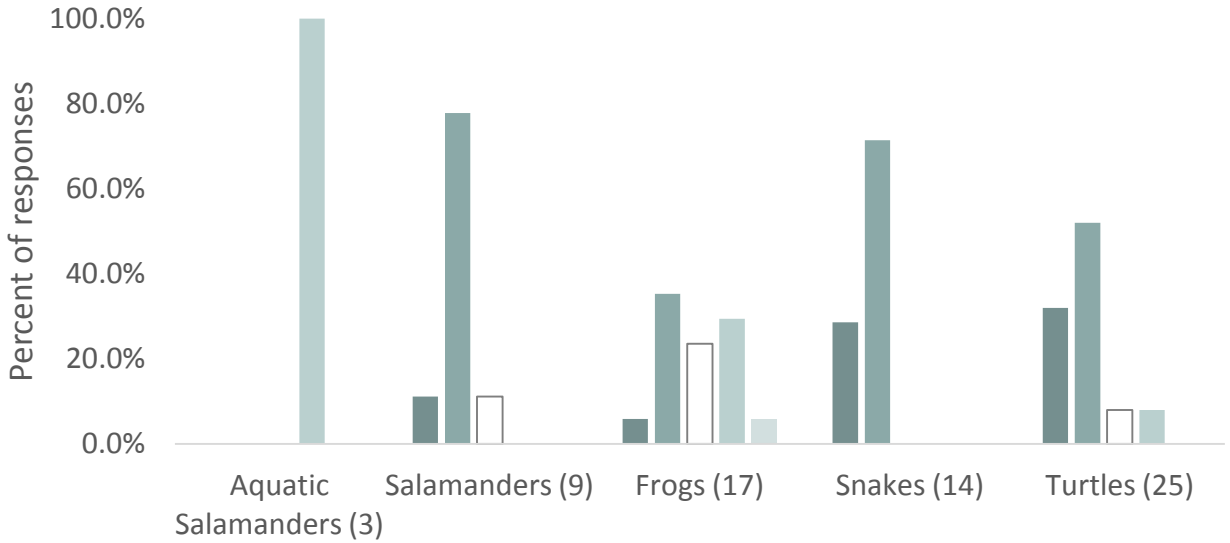
Current Amount of Habitat for Mammals



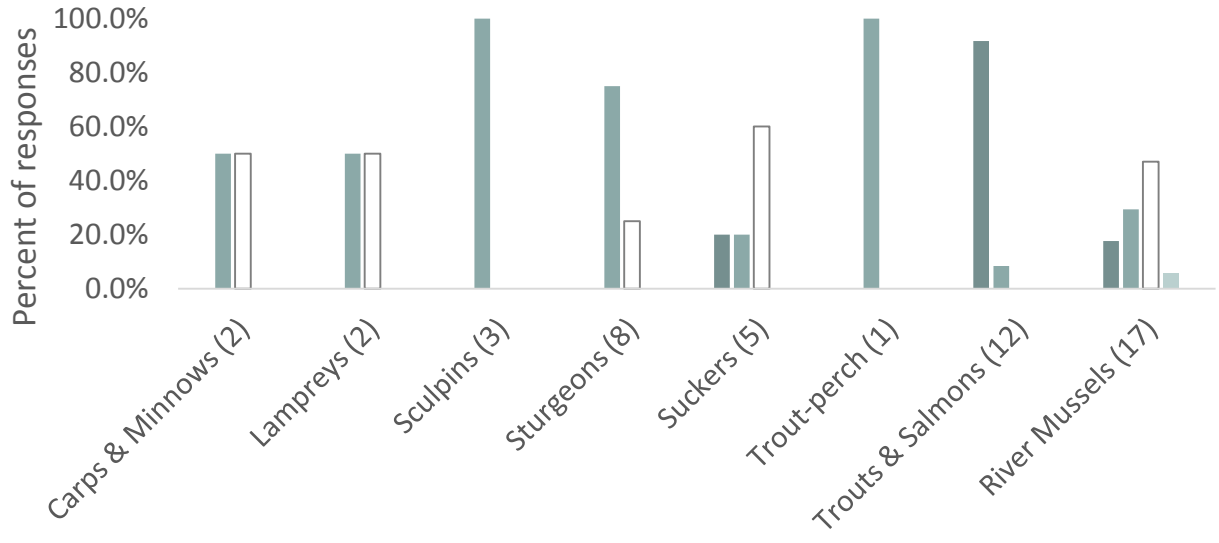
Current Amount of Habitat for Birds



Current Amount of Habitat for Amphibians & Reptiles



Current Amount of Habitat for Aquatic Species

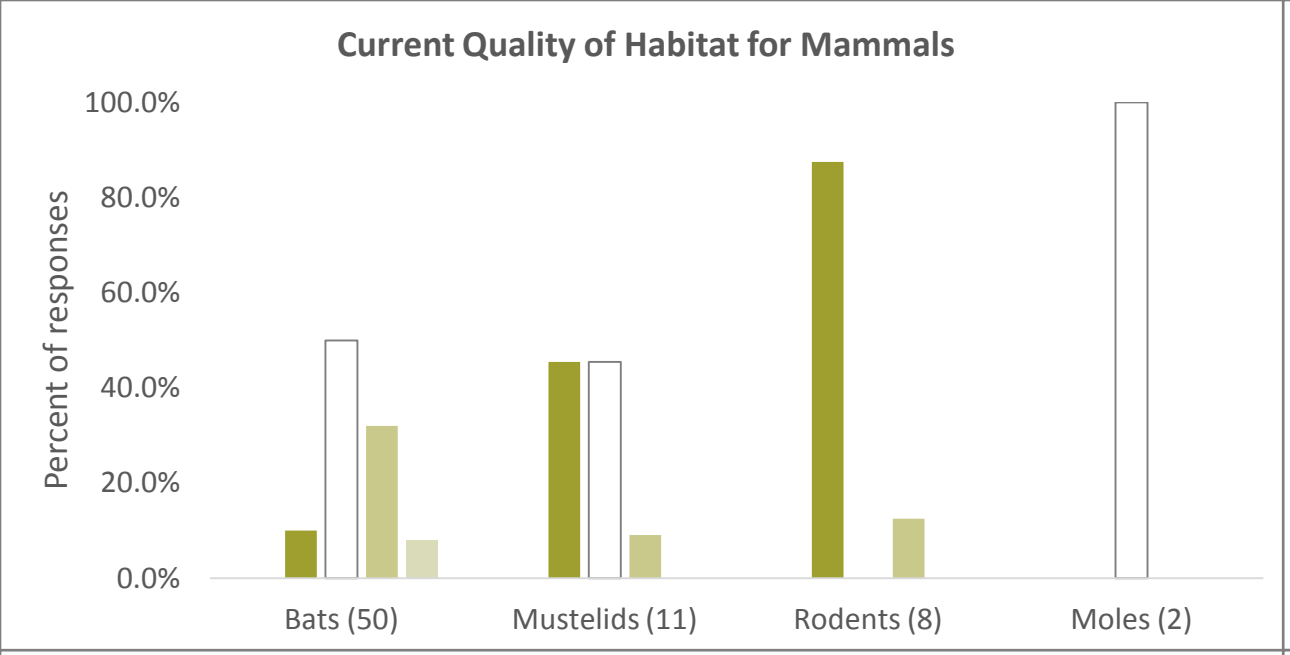


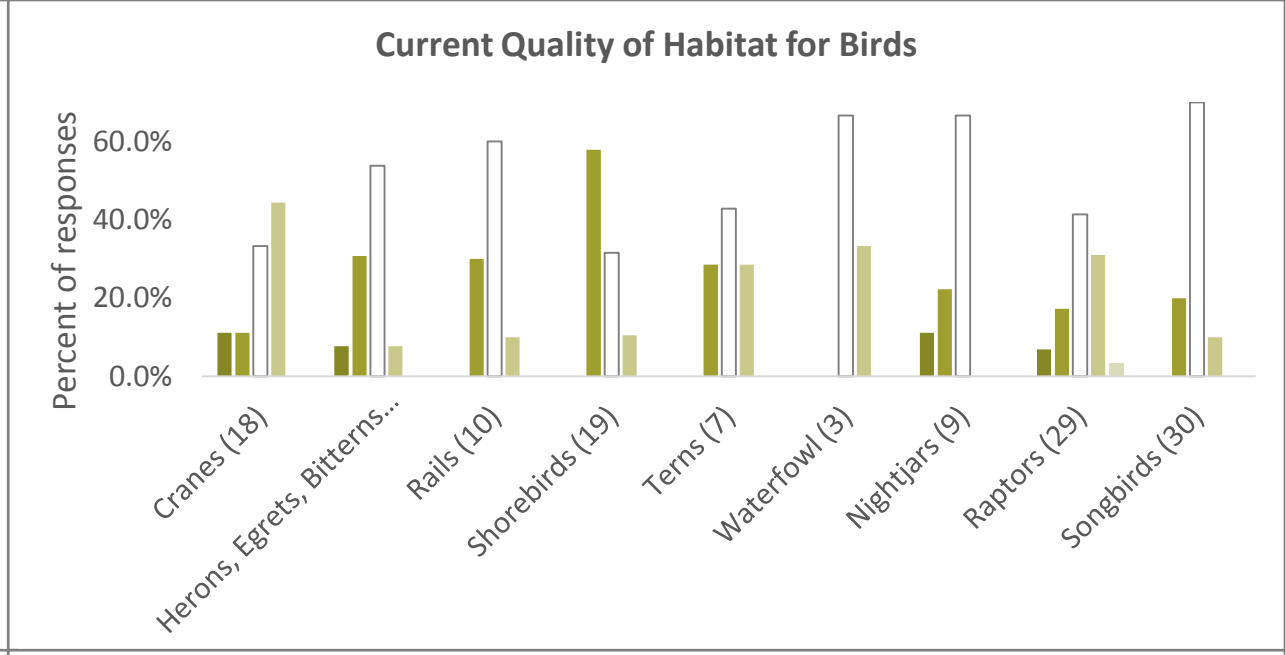
Very limited Limited About right Abundant Very abundant

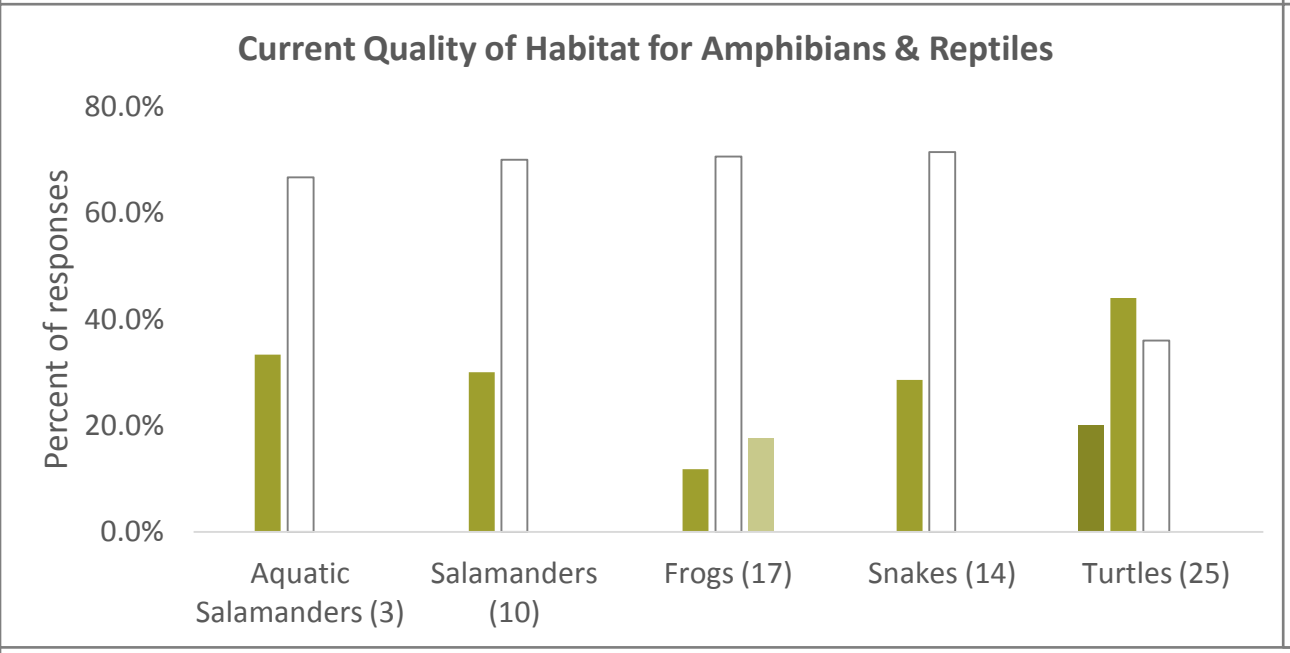
Survey Results: Current Habitat Conditions

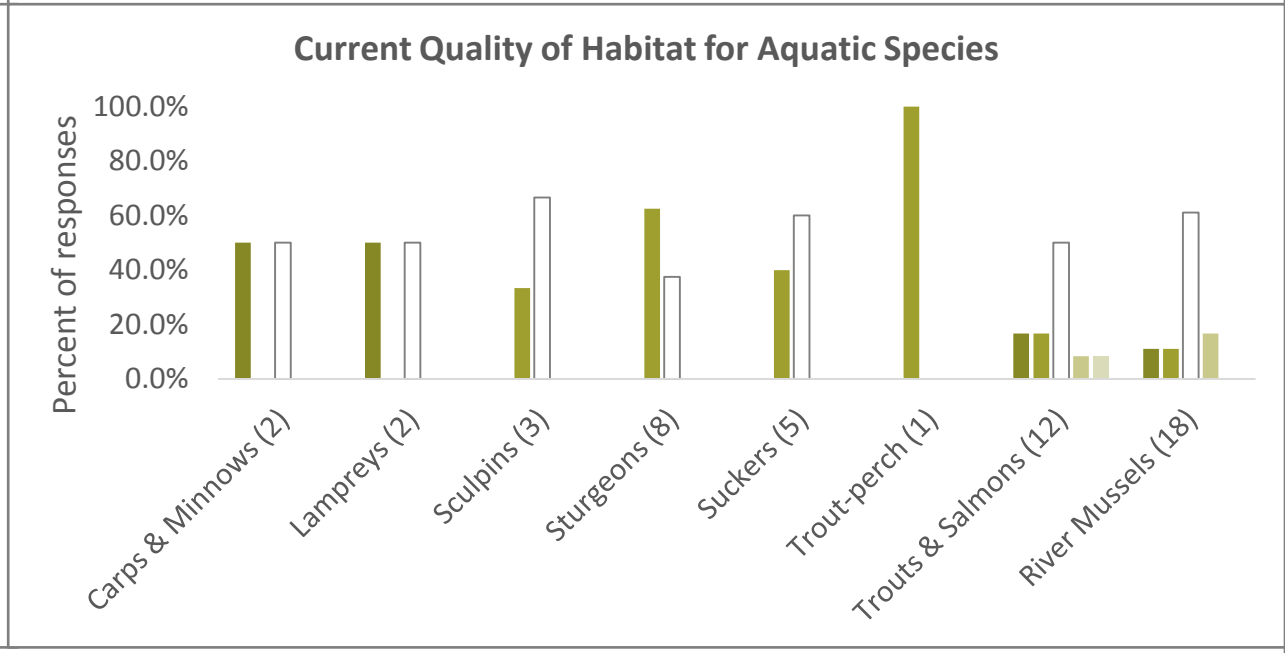
Goal: Understand current habitat conditions for SGCN in terms of both quantity and quality.

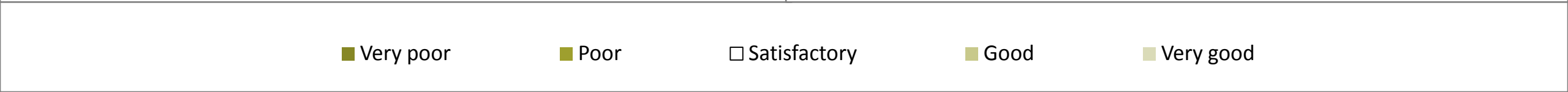
Question: How would you describe the **overall quality** of habitat in Indiana where [species] currently occurs?


Current Quality of Habitat for Mammals
Percent of responses
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Bats (50)
Mustelids (11)
Rodents (8)
Moles (2)


Current Quality of Habitat for Birds
Percent of responses
60.0%
40.0%
20.0%
0.0%
Cranes (18)
Herons, Egrets, Bitterns...
Rails (10)
Shorebirds (19)
Terns (7)
Waterfowl (3)
Nightjars (9)
Raptors (29)
Songbirds (30)


Current Quality of Habitat for Amphibians & Reptiles
Percent of responses
80.0%
60.0%
40.0%
20.0%
0.0%
Aquatic Salamanders (3)
Salamanders (10)
Frogs (17)
Snakes (14)
Turtles (25)


Current Quality of Habitat for Aquatic Species
Percent of responses
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Carps & Minnows (2)
Lampreys (2)
Sculpins (3)
Sturgeons (8)
Suckers (5)
Trout-perch (1)
Trouts & Salmons (12)
River Mussels (18)

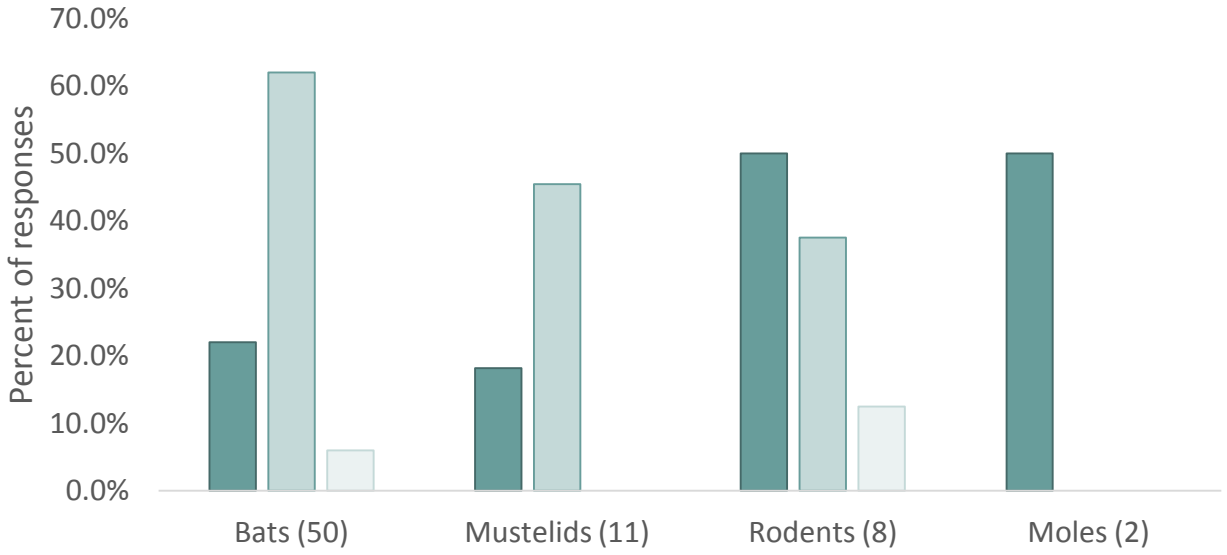

Very poor
Poor
Satisfactory
Good
Very good

Survey Results: Habitat Trends

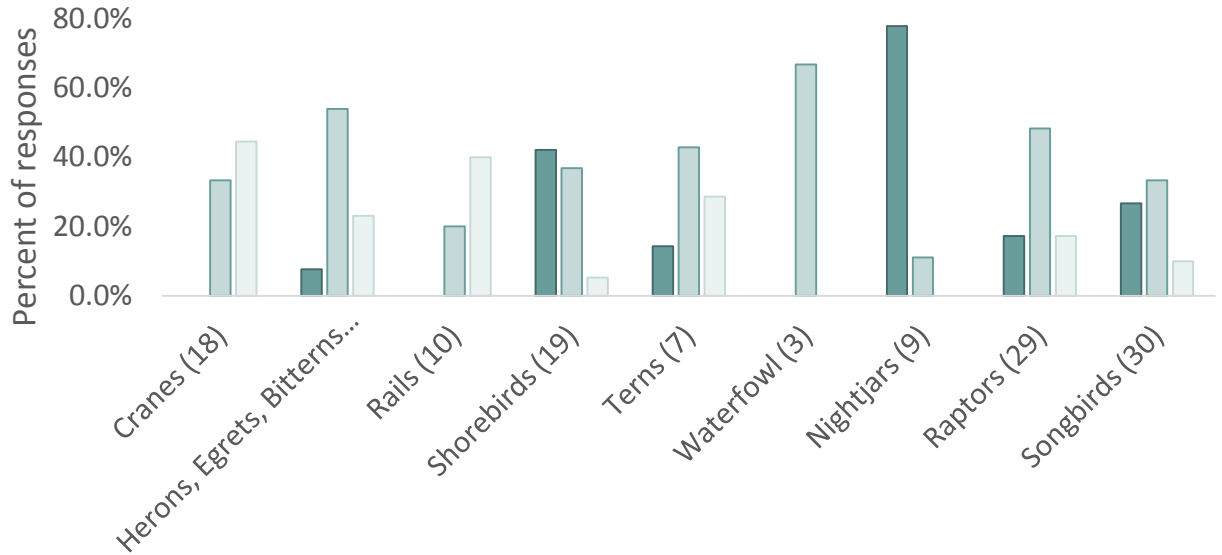
Goal: Understand how habitat for SGCN has changed since the 2005 SWAP was implemented, in terms of both quantity and quality.

Question: How would you describe changes in the **total amount** of habitat for SGCN in Indiana **since 2005**?

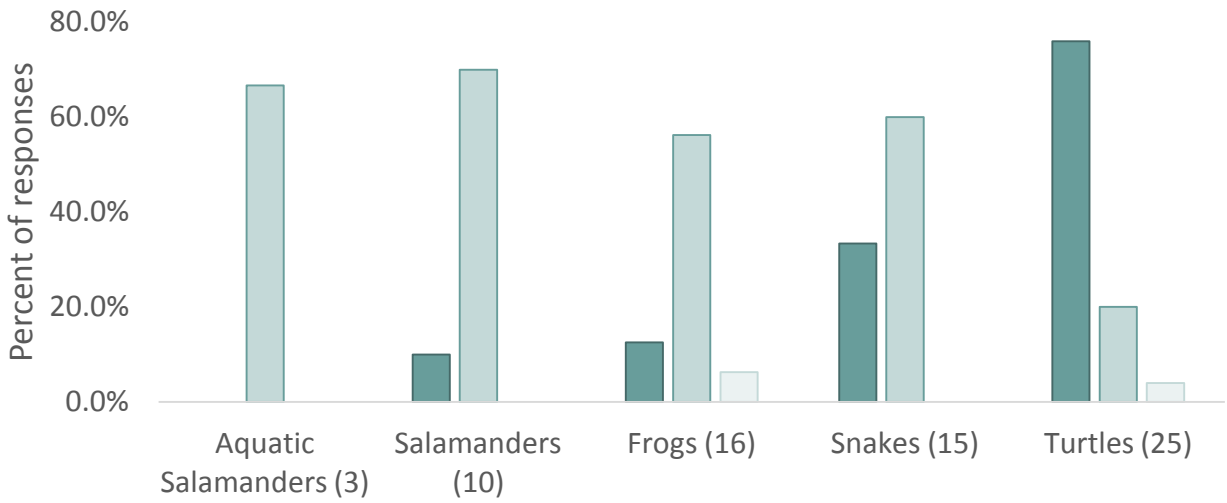
Changes in Amount of Habitat for Mammals since 2005



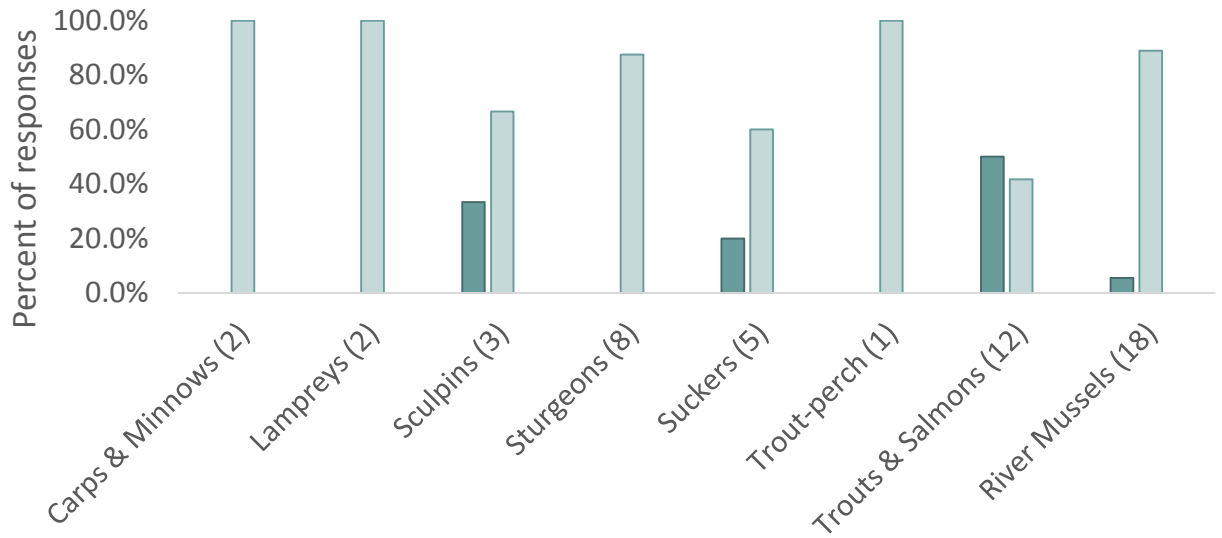
Changes in Amount of Habitat for Birds since 2005



Changes in Amount of Habitat for Amphibians & Reptiles since 2005



Changes in Amount of Habitat for Aquatic Species since 2005



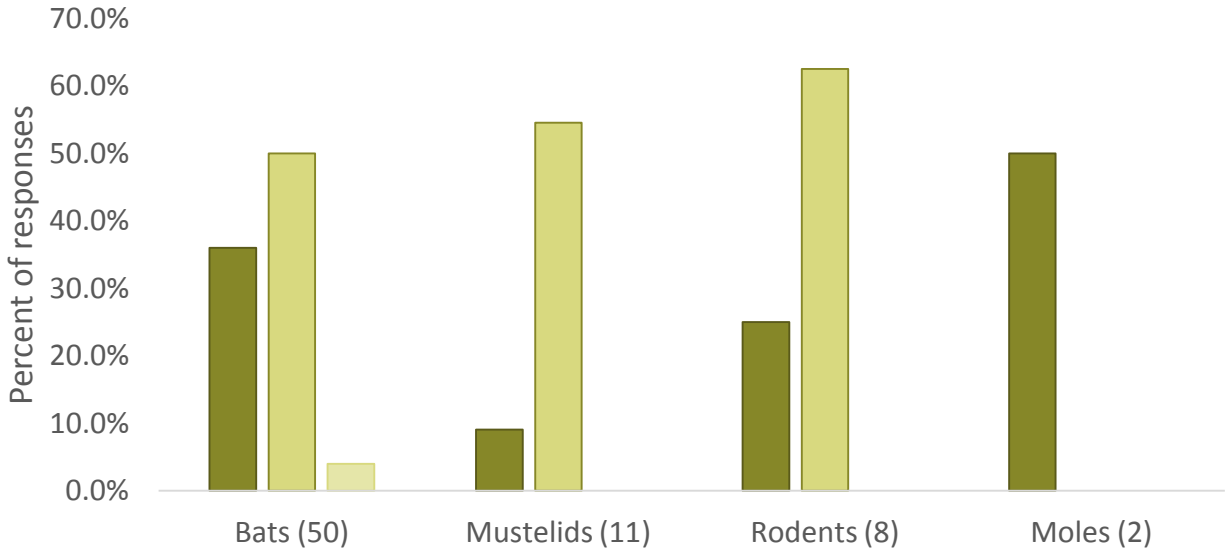
Decrease About the same Increase

Survey Results: Habitat Trends

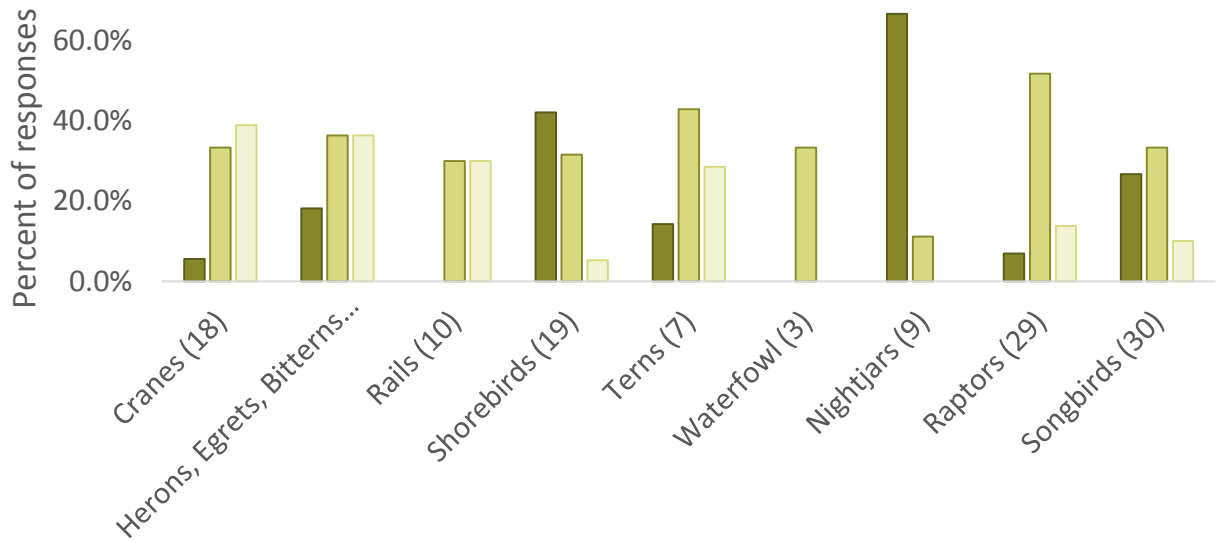
Goal: Understand how habitat for SGCN has changed since the 2005 SWAP was implemented, in terms of both quantity and quality.

Question: How would you describe changes in the **overall quality** of habitat for SGCN in Indiana **since 2005**?

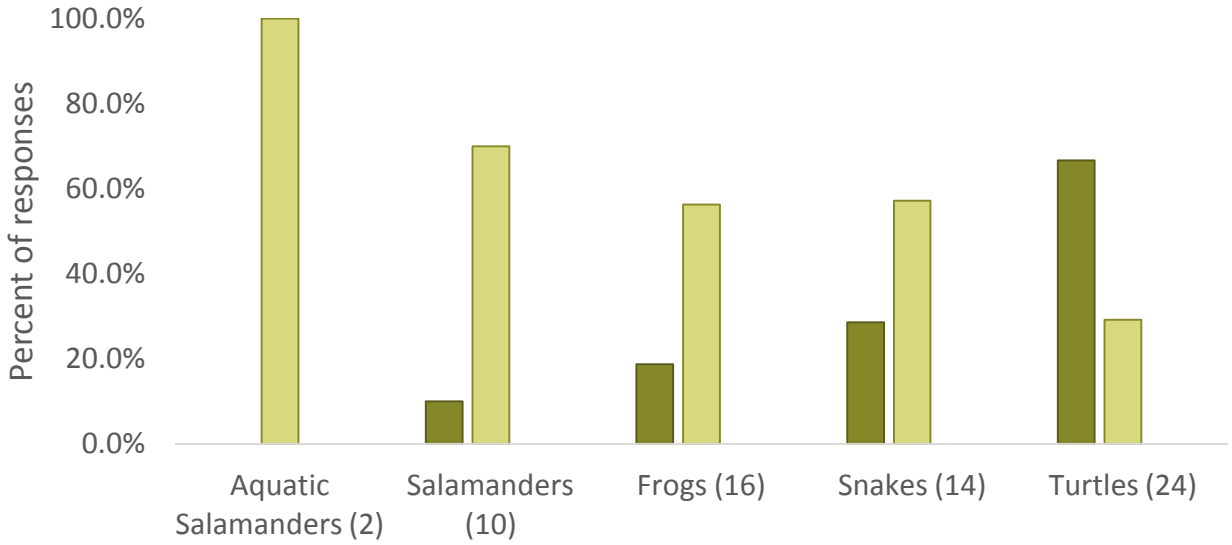
Changes in Habitat Quality for Mammals since 2005



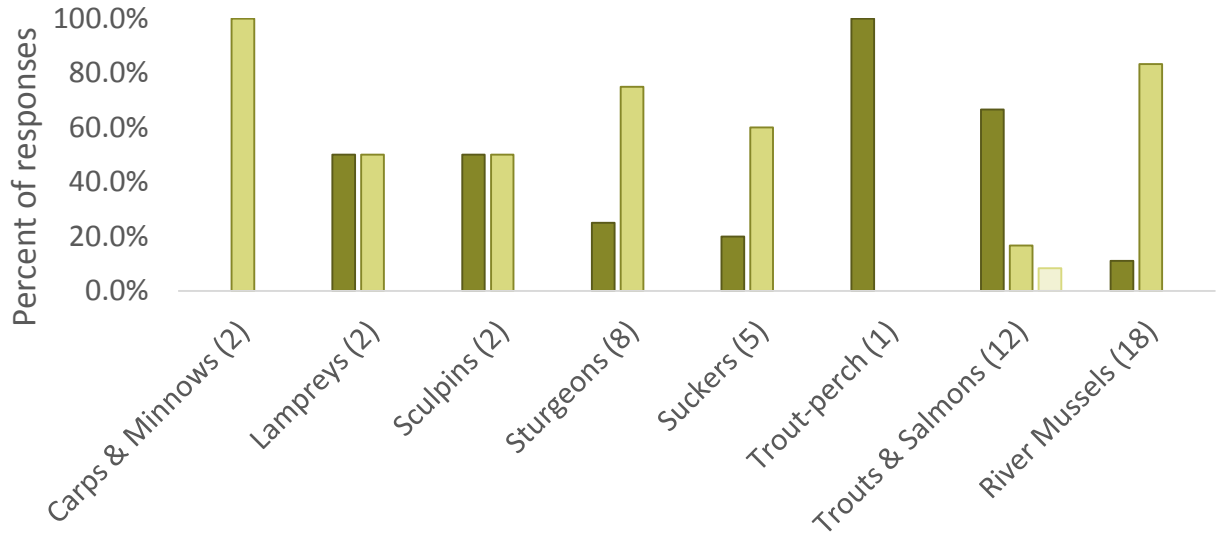
Changes in Habitat Quality for Birds since 2005



Changes in Habitat Quality for Amphibians & Reptiles since 2005



Changes in Habitat Quality for Aquatic Species since 2005



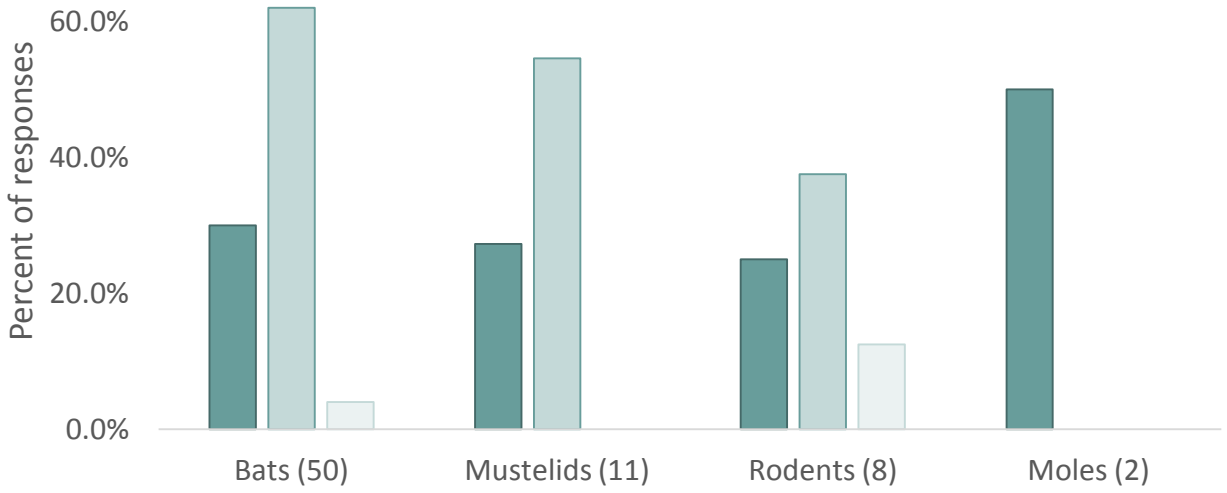
Decrease About the same Increase

Survey Results: Habitat Trends

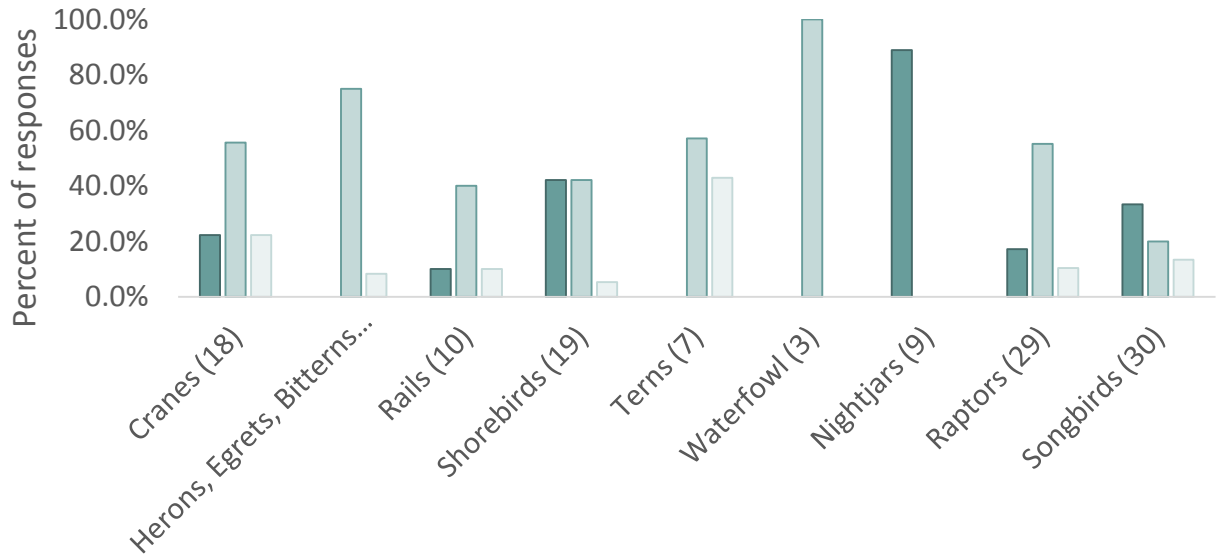
Goal: Understand how habitat for SGCN can be expected to change while the 2015 SWAP is in place, in terms of both quantity and quality.

Question: How would you predict the **total amount** of habitat for SGCN in Indiana to change **over the next 10 years**?

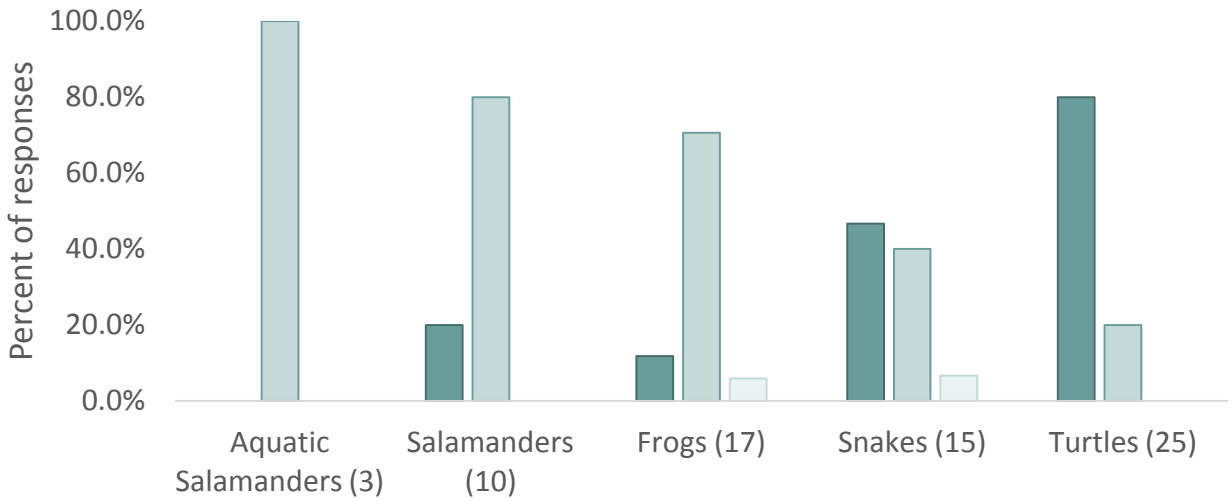
Changes in Total Amount of Habitat for Mammals by 2025



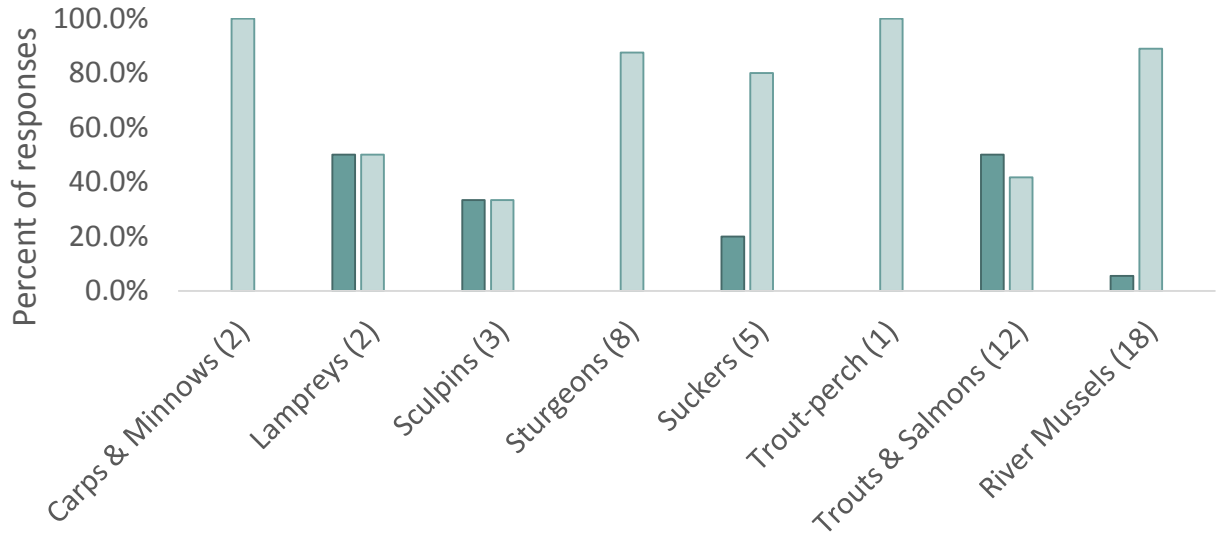
Changes in Total Amount of Habitat for Birds by 2025



Changes in Total Amount of Habitat for Amphibians & Reptiles by 2025



Changes in Total Amount of Habitat for Aquatic Species by 2025

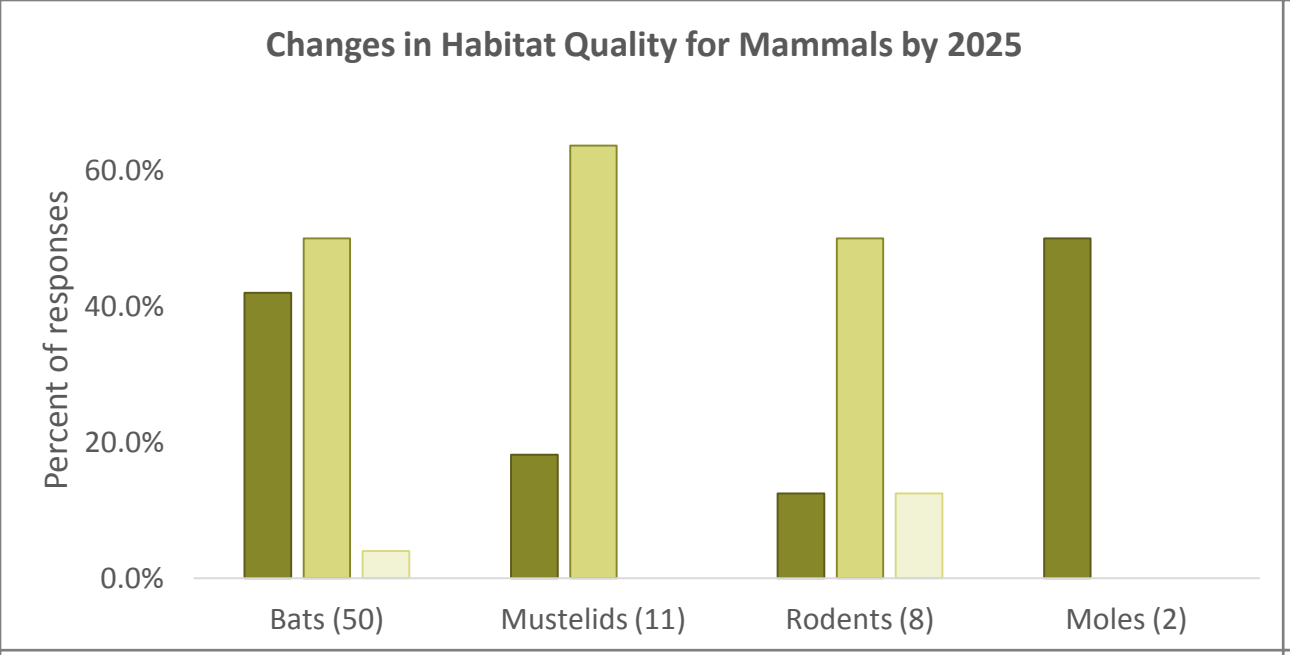


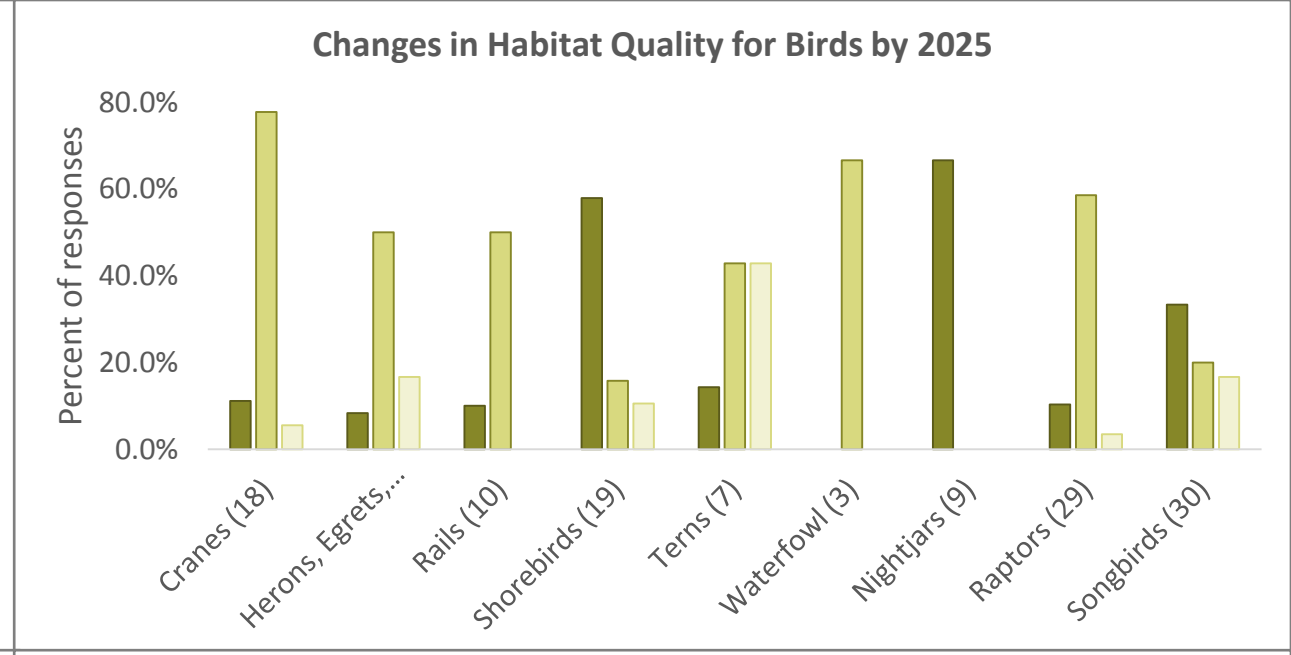
Decrease About the same Increase

Survey Results: Habitat Trends

Goal: Understand how habitat for SGCN can be expected to change while the 2015 SWAP is in place, in terms of both quantity and quality.

Question: How would you predict the **overall quality** of habitat for SGCN in Indiana to change **over the next 10 years**?


Changes in Habitat Quality for Mammals by 2025
Percent of responses
60.0%
40.0%
20.0%
0.0%
Bats (50)
Mustelids (11)
Rodents (8)
Moles (2)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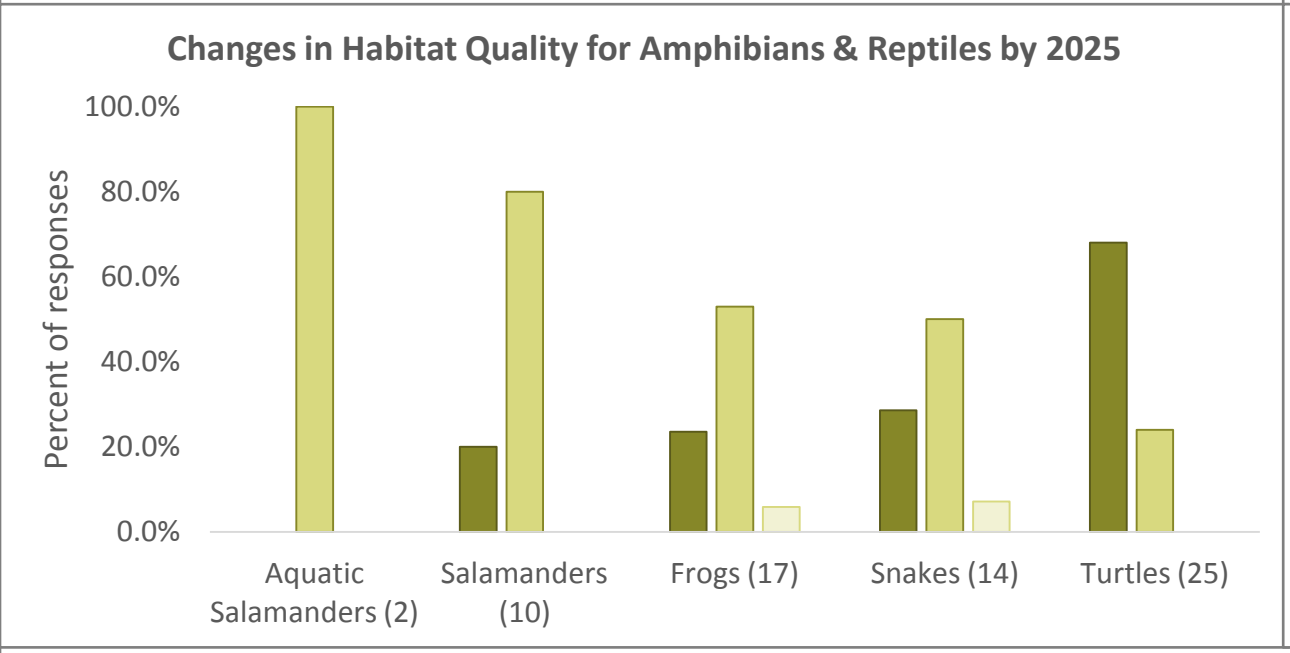
Songbirds (30)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40.0%
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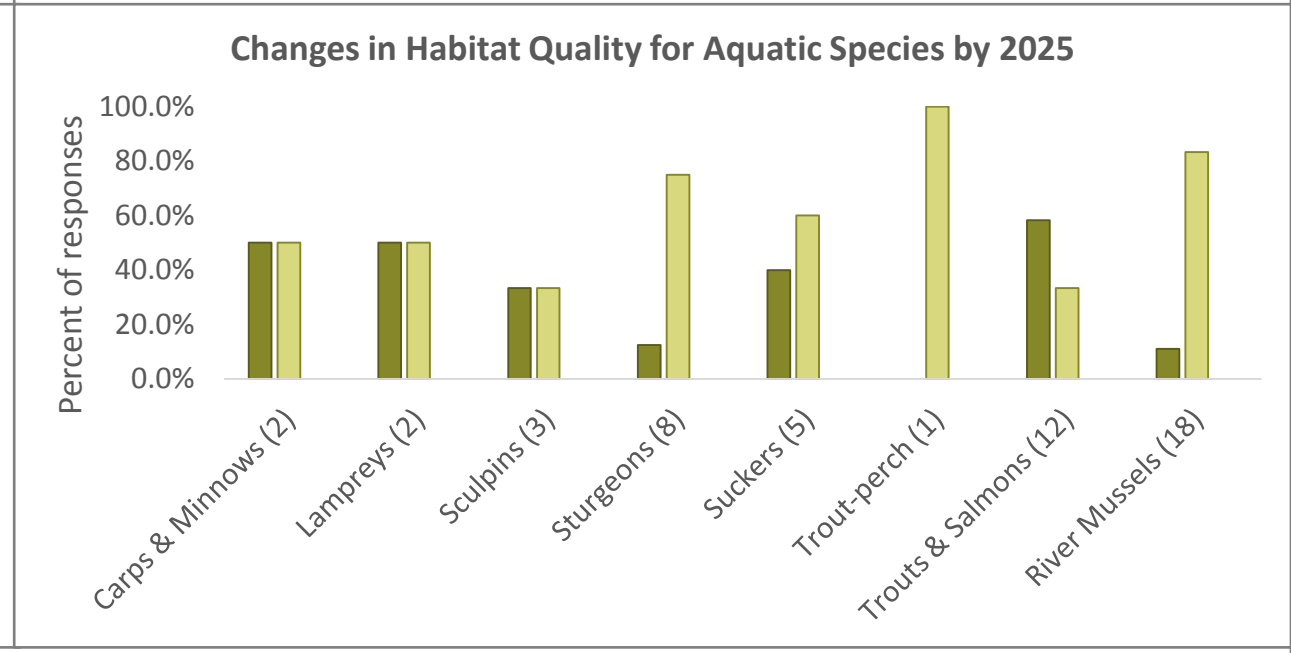
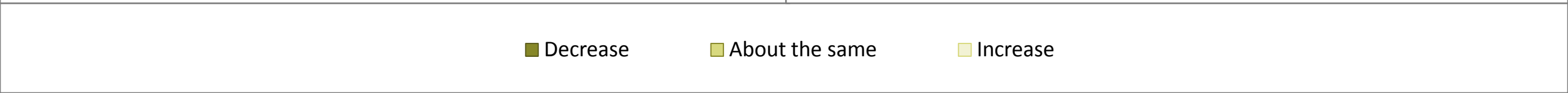
0.0%
Aquatic Salamanders (2)
Salamanders (10)
Frogs (17)
Snakes (14)
Turtles (25)


Changes in Habitat Quality for Aquatic Species by 2025
Percent of responses
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Carps & Minnows (2)
Lampreys (2)
Sculpins (3)
Sturgeons (8)
Suckers (5)
Trout-perch (1)
Trouts & Salmons (12)
River Mussels (18)


Decrease
About the same
Increase

Habitat Suitability Modelling

USING THE BEST AVAILABLE SCIENCE TO INFORM INDIANA'S SWAP

SWAP *Conservation doesn't just happen. It requires resources and collaboration.*

Landscape-level Habitat Modelling

Purpose

- Predictive tool to help us set priority actions
- Objective, quantitative metric
- Proof-of-concept for effectiveness of priority actions ranked in surveys

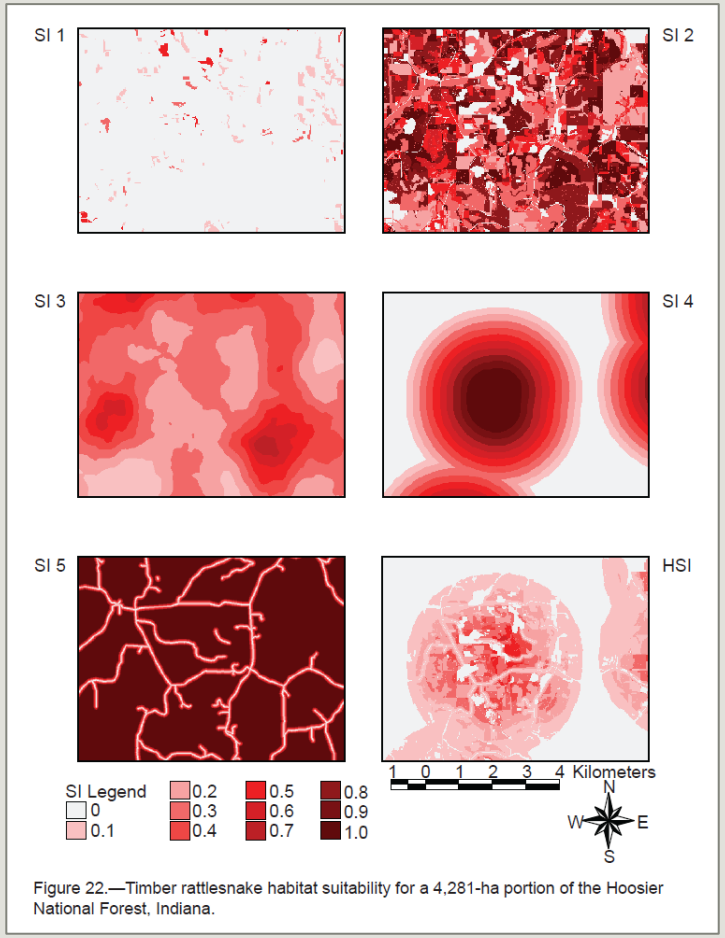


Figure 22.—Timber rattlesnake habitat suitability for a 4,281-ha portion of the Hoosier National Forest, Indiana.

→ Timber rattlesnake landscape-level habitat suitability maps. Individual suitability indices contributed to the HSI: early successional forest and canopy gaps, woody debris (stand age), habitat composition, proximity to hibernacula, distance from roads (Rittenhouse *et al*. 2006).

Landscape-level Habitat Modelling

Process

- Implement models for suite of representative species (4-5) in each region in GIS environment
- Assess habitat suitability with current conditions
- Construct alternate landscape configurations representing possible outcome of actions
- Reapply models to future landscapes and assess how habitat suitability has changed
- Evaluate relative effectiveness of action scenarios
- Use results to inform prioritization of actions

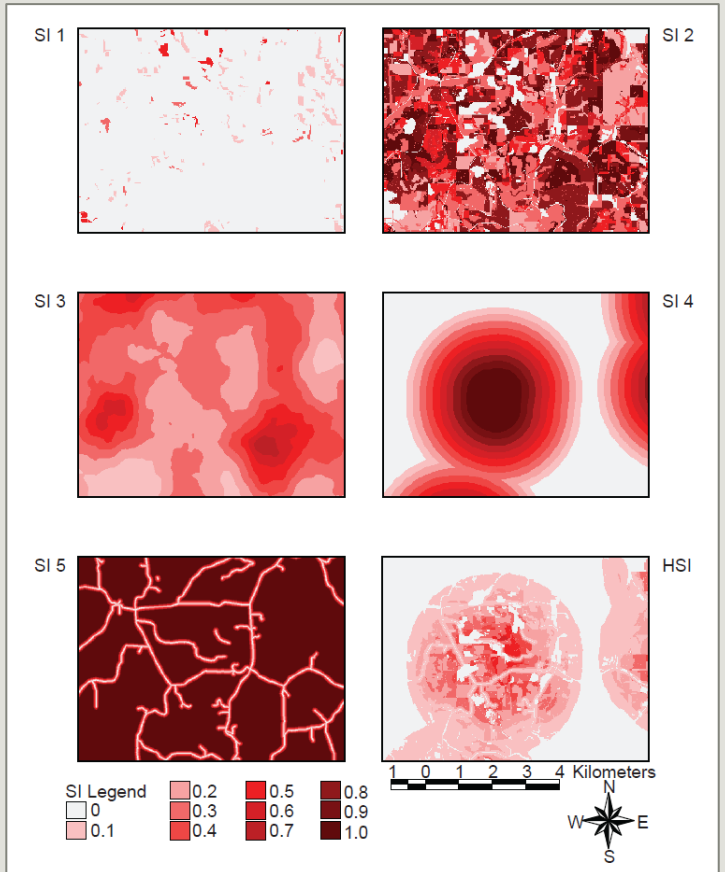
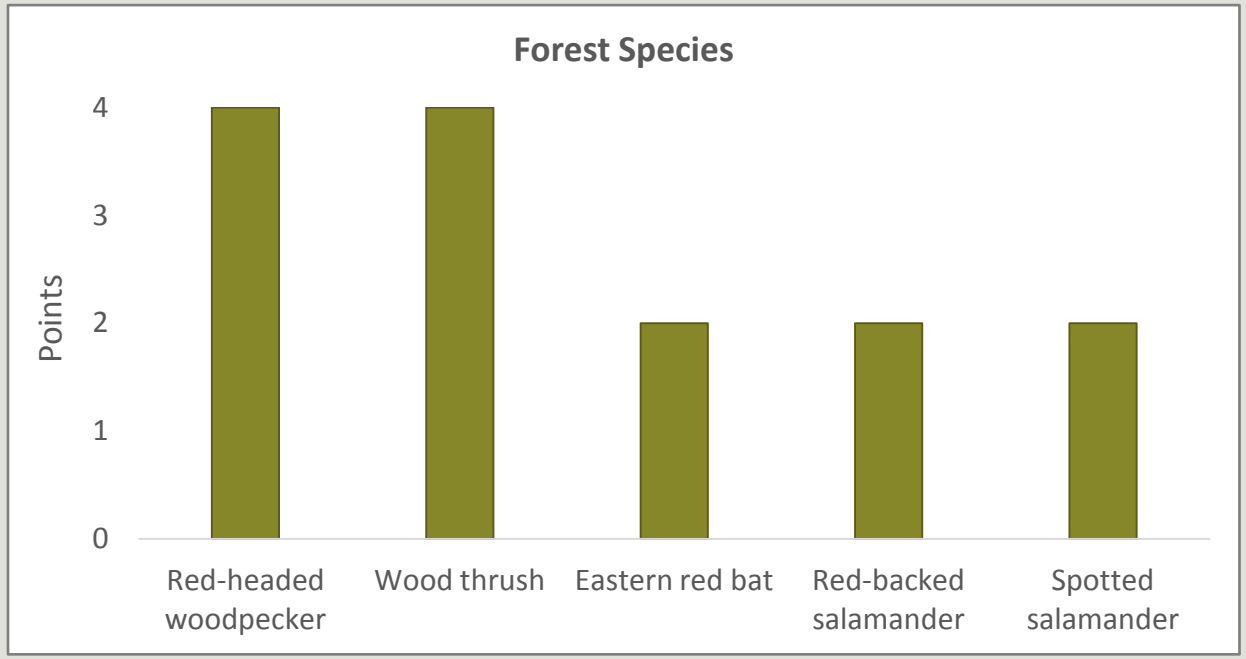
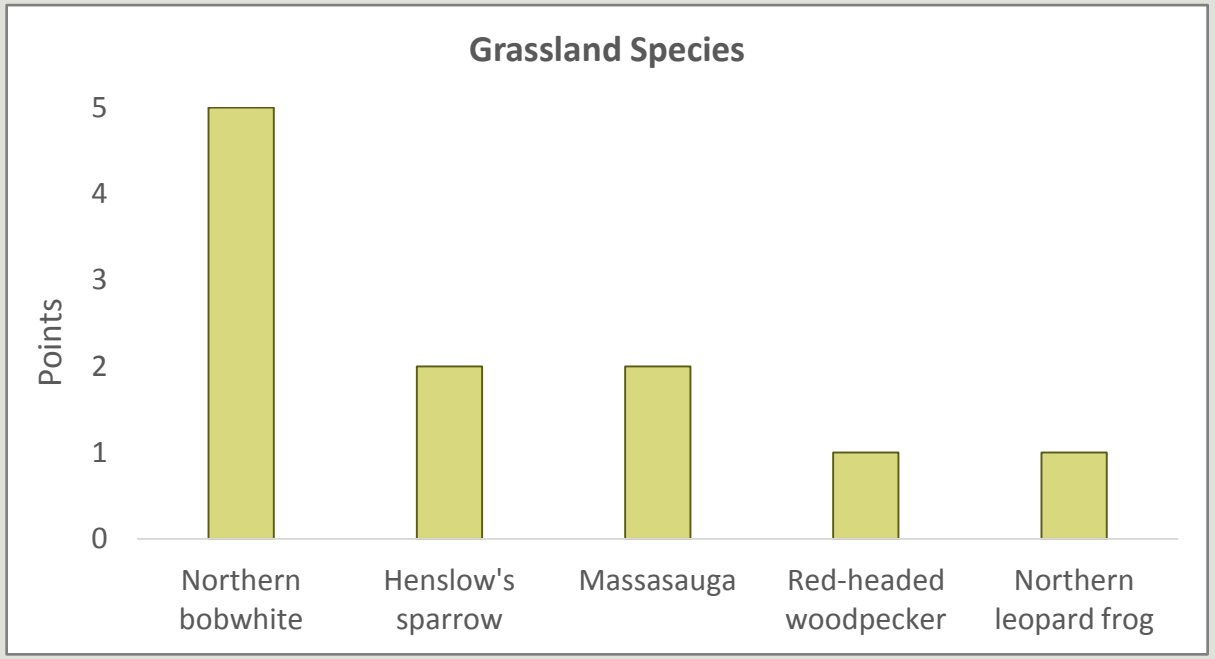


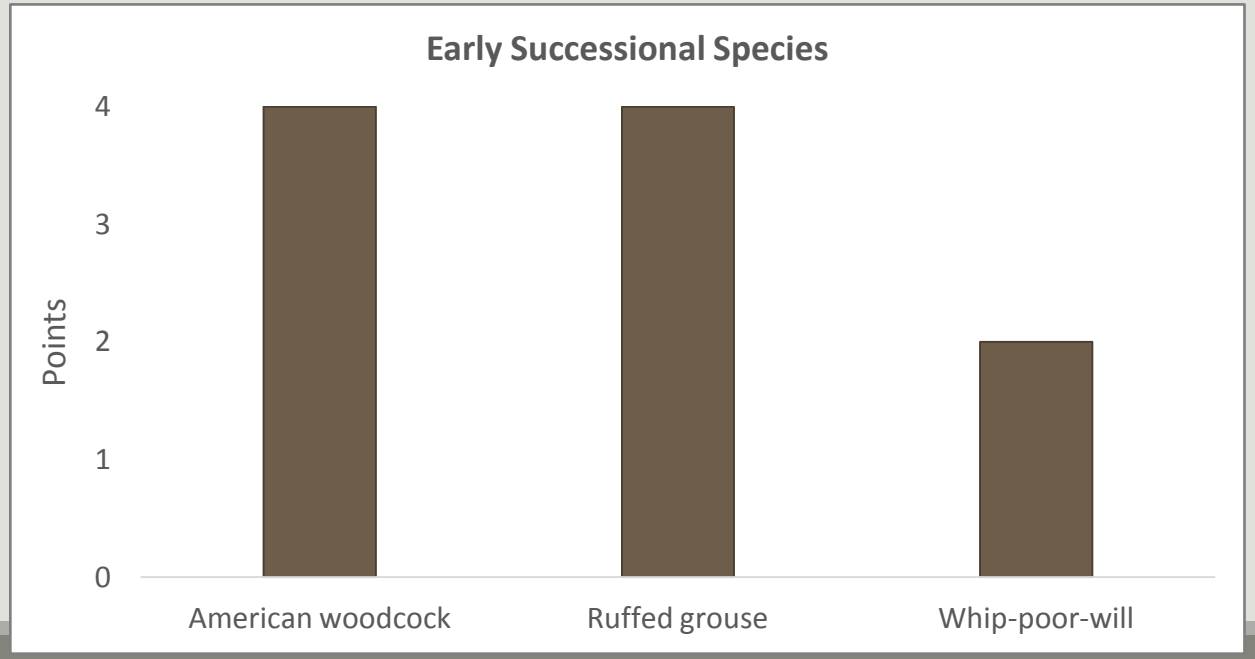
Figure 22.—Timber rattlesnake habitat suitability for a 4,281-ha portion of the Hoosier National Forest, Indiana.

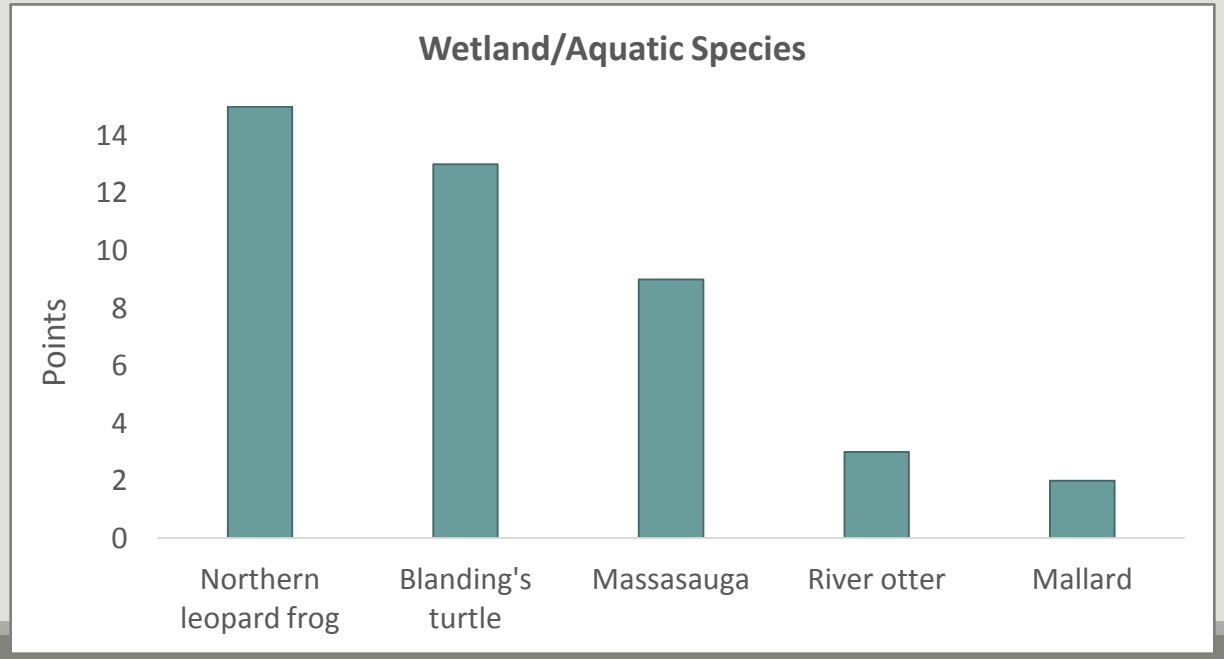
Selection of Species for Modelling

1. Conducted focus group with ~20 species technical experts to produce initial list of options for each region
2. Species suggested were based on a set of criteria:
    a. Actions on the ground make a difference in habitat quality for the species
    b. Improved habitat quality for the species could represent improvement in habitat quality for a wide range of other species (umbrella effect)
    c. Enough data available to build a model
3. Survey 1 respondents voted or suggested additional species


Forest Species
Points
4
3
2
1
0
Red-headed woodpecker
Wood thrush
Eastern red bat
Red-backed salamander
Spotted salamander


Grassland Species
Points
5
4
3
2
1
0
Northern bobwhite
Henslow's sparrow
Massasauga
Red-headed woodpecker
Northern leopard frog


Early Successional Species
Points
4
3
2
1
0
American woodcock
Ruffed grouse
Whip-poor-will


Wetland/Aquatic Species
Points
14
12
10
8
6
4
2
0
Northern leopard frog
Blanding's turtle
Massasauga
River otter
Mallard

Selection of Species for Modelling

4. Ranked species by survey responses and selected final suite based on:
    a. Best data availability for models
    b. Representation of multiple taxa
    c. Representation of all focal habitat types in each region
5. Final lists were reviewed and approved by Core & Advisory Teams and IDNR wildlife diversity staff

Region 1 Habitat Models

Species selected: American woodcock, northern bobwhite, eastern red bat, Blanding's turtle, red-headed woodpecker*, Henslow's sparrow*, northern leopard frog* (*=time-permitting)

Habitats/features of interest represented: Grasslands, savannas, ag lands, mature forest, early successional forest, aquatic systems, wetlands, habitat connectivity